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ABSTRACT

Hyland and Boer (2006) introduced the "continuous innovation stool", describing continuous innovation in terms of operational, innovation and strategic capabilities. They hypothesized that the better a firm aligns, coordinates and/or integrates the functions responsible for these areas, the higher and more sustainably the firm will perform. The purpose of this paper is to test the stool model, using data obtained from the Chief Operating Officers and the Chief Technology Officers from 189 firms in eight countries. The analyses show that firms that excel at innovation management, are also more likely to be good at managing operations and strategic choices. Also, and more important, the higher the firm's capabilities on these three domains, the better their business performance, which is a first confirmation of the "continuous innovation stool".

Keywords*: continuous innovation, strategic alignment, operational excellence, sustained business performance.*

1. INTRODUCTION

In their "continuous innovation stool", Hyland and Boer (2006) describe continuous innovation in terms of three critical capabilities that, if orchestrated and performed to an excellent degree, should lead to sustained business performance:

- Operational capability, which enables a firm to satisfy today's customers' demands in terms of indicators such as price, quality, speed and variety (Boer, 2001).
- Innovation capability, which enables the satisfaction of (the-day-after-) tomorrow's customers (Boer, 2001).
- Strategic capability, the capability to make strategic decisions aimed not only at "doing things right" but also at "doing the right things" (Teece, 2014).

Expressed in March's (1991) terminology, operations excellence requires exploitation excellence; innovation and strategic excellence require exploration excellence. This paper contributes to the development of continuous innovation theory on one of the most debated challenges in the literature, by testing one of Hyland and Boer's (2006) hypotheses, namely that combining operations/exploitation and innovation and strategic/exploration excellence produces superior performance.

First, we present the continuous innovation stool. Next, referring to research conducted since the Hyland and Boer (2006), we show that there is no reason to change the model. Then, we account for the research design, and present and discuss the statistical results. Finally, we formulate the contribution of the paper to continuous innovation theory, together with suggestions for further research.

2. THEORETICAL BACKGROUND AND HYPOTHESES

Figure 1 depicts the continuous innovation stool put forward by Hyland and Boer (2006). Continuous innovation finds its basis in March's distinction between exploitation and exploration and the need to combine them effectively. "*Exploitation includes […] refinement, choice, production, efficiency, selection, implementation, execution", while "exploration includes […] search, variation, risk taking, experimentation, play, flexibility, discovery, innovation*" (March, 1991, p. 71).

According to Stacey (1992), continually innovative organizations cannot choose between systems and structures that support exploitation and systems that support exploration. Successful organizations must have both at the same time. The question is: how can firms deal with the exploitation/exploration paradox (March, 1991) and make "both/and" rather than "either/or" choices (Stacey, 1992)? Hyland and Boer (2006) argue that strategic capability could be the missing link. Referring to the notion of dynamic capability theorized by Teece (2007), they argue that continuous innovation requires the capability to sense (requiring strategic capability), seize and transform (requiring innovation and operational capability) market and technological opportunities (Teece, 2007), to be and remain successful in the market place at the same time, all the time (Hyland and Boer, 2006).

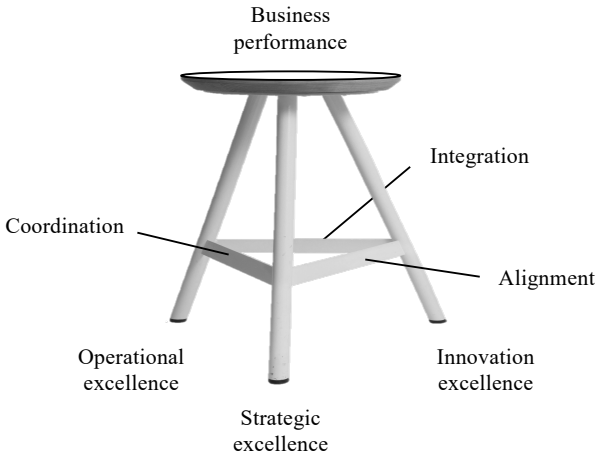

Figure 1. The continuous innovation stool (from Hyland and Boer, 2006)

After 2006, when Hyland and Boer developed their model, many authors have researched exploitation and exploration. A cursory literature review of papers published since 2006 shows a high variety of:

- Definitions/operationalizations.
- Research designs, in the form of conceptual, literature-based studies, studies using archival data, including company data and external databases, case studies and surveys.
- Contextual variables and ways in which these variables are modeled, e.g. as drivers, antecedents or enablers, control, moderating or mediating variables.

While some authors do not define exploitation and exploration (e.g. Birkinshaw and Gupta, 2013; Markides, 2013), most papers largely fall into one of two categories:

- Papers using March's description of exploitation and exploration (e.g. Gupta et al., 2006; Lavie and Rosenkopf, 2006; Lubatkin et al., 2006; Menguc and Auh, 2008; O'Reilly and Tushman, 2008; Raisch and Birkinshaw, 2008; Bierly et al., 2009; Simsek et al., 2009; Simsek, 2009; Farjoun, 2010; Lavie et al., 2010; O'Reilly and

Tushman, 2013; Tamayo-Torres et al., 2015).

- Papers focusing on exploitative and explorative innovation (e.g. Greve, 2007; Jansen et al., 2006, 2009a, 2009b; Zhou and Wu, 2010; Chang and Hughes, 2012; Junni et al., 2013).

Several papers discuss the role of structural, temporal and/or contextual ambidexterity, and consider organization-related variables as drivers, antecedents or enablers of exploitation and exploration. Jansen et al. (2006, 2009a, 2009b) use behavioral practices to operationalize exploitation and exploration. Farjoun (2010), Zhou and Wu (2010) and Tamayo-Torres et al. (2014) hint at the possible role of technology. In the resource-based and related views, there is a wealth of nouns, adjectives and verbs associated with the term "resource" – see Kellermanns et al. (2016) for an overview and discussion of the differences and relationships between terms such as capacity, capability, competence, knowledge and resource. Rather than engaging in that debate, we adopt an operations management approach and define capability as the practices and technologies that can drive the achievement of a competitive advantage.

Although there is a lack of consensus regarding the operationalization and role of contextual variables in the literature, the review shows that the stool model remains unchallenged. Specifically, the following conclusions emerge:

- It is generally accepted that exploitation and exploration are distinctively different capabilities.
- A firm's goodness of exploitation, exploration and their combination has important performance effects, which, however, are context-dependent.

Although conceptually unchallenged, empirical evidence is needed to test the "stool" model. Hyland and Boer (2006) proposed eight hypotheses to be tested in this sense. The ones addressing the core of the continuous innovation stool are:

1. The better a firm bundles relevant capabilities in each of the three critical competence areas (the legs), the stronger the three competences and the better the firm's operational, innovation and strategic performance and, through that, business performance.
2. The better a firm organizes the interplay between the three critical competence areas, the better the firm's business performance.

The remaining six hypotheses focus on the notion that there is no "one single best continuous innovation solution – it all depends", that is, firm internal and external contingencies play a role. In this paper, we test the hypotheses depicted in Figure 1.

3. RESEARCH DESIGN

The hypotheses were tested through the CINet survey conducted in 2017 in Italy, the Netherlands, Denmark, Switzerland, Spain, Hungary, Pakistan and Sweden. A sample made of 165 firms was built through a multi respondent questionnaire, differentiated for COO, who were questioned on their firms' operations management and strategic management capabilities and CTO, who provided information on the innovation management capabilities. The sample included both medium-sized and large enterprises in manufacturing industries. We used OLS regression models and the Barron and Kenney test for assessing mediation in the relationship between capabilities and business performance. Table 1 reports the operationalization of the key constructs.

Business performance can be affected by a multitude of factors, beyond capabilities. For the reason of avoiding omitting bias, we included size, market and technological dynamism and competition intensity in the regression models.

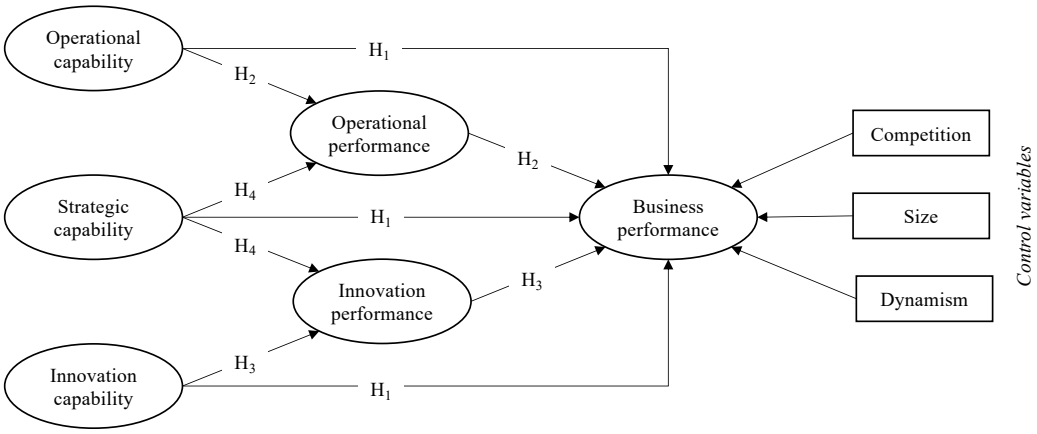

Figure 2. The hypotheses tested in this paper

4. FINDINGS

Table 2 reports descriptive statistics of the various variables under examination and shows the presence of high positive and significant correlation coefficients (> 0.45 in each case). Thus, firms that are good at one capability are more likely to be good in the other two capabilities, too. It is also worth noting that innovation and operational capabilities are positively correlated with firm size, whereas strategic capabilities seem uncorrelated with size. Also, business performance is positively and significantly correlated with operation and strategic capabilities, whereas its level of correlation with innovation capability is significant just at the 10% p-value. Table 3 contains the various models that have been exploited in order to test the hypotheses of Figure 1.

In H_1, we posit that strategic, innovation and operational capabilities explain superior business performance. We first tested the effect of each of these variables separately and with no mediation effect due to performance at the functional level. Next, we tested each of these effects simultaneously in a specification model that included each of the independent variables. We found that both strategic and operational capability have a positive effect on business performance, when their effect is considered separately (model 1 and 2, respectively). By contrast, innovation capability has no effect. However, when all the three capabilities are considered as causal variables of the final dependent variable (business performance), only operational capability has a significant and positive effect on business performance (model 4). In sum, H_1 cannot be fully supported.

In H_2, we posit that the impact of operational capability on business performance is fully mediated by operational performance. Model 2 highlights that operational capability has a positive effect on business performance. Also, operational capability has a positive effect on operational performance (model 5). In turn, operational performance has a positive effect on business performance (model 7). Model 8 shows that operational capability has no significant effect on business performance when the mediation effect of operational performance on business performance is considered. Specifically, model 8 confirms the significant effect of operational performance on business performance highlighted by model 7. Overall, these results support the hypothesis of a full mediation effect linking operational capability to business performance through operational performance. Hence, H_2 is supported.

In H_3, we posit that the impact of innovation capability on business performance is mediated by innovation performance. Innovation capability has no effect on business performance (model 3), but a positive effect on innovation performance (model 6). In

Table 1. Operationalisation

Variable	Cronbach's Alpha	Description	Sources
Business performance	0.937	**Our *average* performance relative to our main competitors over the past three years (1=much lower, 5=much higher)**: Sales Sales growth Net profit Profit growth Return on sales	González-Benito (2007), IMSS (2013)
Operational performance	0.872	**Over the past three years, our performance relative to our main competitors was, on average (1=much worse, 5=much higher)** Internal quality (e.g. conformance to product specifications, percentage of scrap and rework) On-time delivery Customer satisfaction and loyalty External quality (e.g. product quality and reliability; ease of product maintenance, repair, disassembly and recycling; defect products returned by customers) Service performance (e.g. provision of spare parts/consumables; rental/lease of products; help-desk, customer support center; training and consultancy; installation/implementation) Order size flexibility Customer order delivery time Cost effectiveness (including ordering cost, manufacturing cost, quality cost, inventory cost; man, machine, material efficiency) Production lead time (including manufacturing and assembly) Mix flexibility Time needed to launch new, changed or modified products in production	Kim and Arnold (1993), Nobel (1995), Ward et al. (1998), Samson and Terziovski (1999), Kathuria (2000), Devaraj et al. (2001), Boyer and Lewis (2002), Oliva and Kallenberg (2003), Shah and Ward (2003), Swink et al. (2005), Amoako-Gympah and Meredith (2007), Antioco et al. (2008), Peng et al. (2008), Avella and Vázquez-Bustelo (2010), Ahmad and Schroeder (2011), Avella et al. (2011), Ngo and O'Cass (2012), IMSS (2013), Kortmann et al. (2014), Saccani et al. (2014), He et al. (2015)
Innovation performance	0.950	**Over the past three years, our performance relative to our main competitors was, on average (1=much worse, 5=much higher)** Development of new products that differ substantially from our existing products Project planning accuracy (e.g. percentage of projects over-running planned project lead time, time-to-market or budget Total new product development costs as a percentage of sales Average number of product improvement, modification and customization suggestions formally evaluated per year Average lead time of product improvement, modification and customization projects Average time-to-market of product improvement, modification and customization projects, from start to market launch Percentage of total sales from improved, modified and customized products introduced in the last three years Average number of product improvement, modification and customization projects launched per year Percentage of product improvement, modification and customization projects successfully completed in the last three years Reputation with customers and competitors for product improvement, modification and/or customization Average time-to-market of radical product innovation projects, from start to market launch Percentage of total sales from radical product innovations introduced in the last three years Average number of radical product innovation projects launched per year	Griffin and Page (1993), Driva et al. (2001), Atuahene-Gima (2005), Hooley et al. (2005), Alegre et al. (2006), Alegre and Chiva (2008), Kim et al. (2012), Sun et al. (2012), Danese and Filippini (2013), Cheng and Huizingh (2014)

		Percentage of radical product innovation projects successfully completed in the last three years Reputation with customers and competitors for radical product innovations	
Strategic capability	0.888	**Indicate the extent to which you agree with the following statements (1=Strongly disagree; 5=Strongly agree)** We continuously monitor and assess the amount of resources we commit for serving customers effectively Our competitive advantage is based on understanding customer needs Our business strategies are driven by the goal of increasing customer value We systematically process and analyze customer information (e.g. about their needs, the way they use our products) to fully understand their implications for our business Our marketing people regularly share information concerning competitors' strategies within our company We rapidly respond to competitive actions that threaten us Top management regularly discusses competitors' strengths and strategies We target customer segments where we have an opportunity for competitive advantage **In our company, functions such as product development, marketing, purchasing and production (1=Strongly agree; 5=Strongly agree)** Coordinate their activities to ensure better use of our market and technological knowledge Regularly share information about customers, suppliers, technologies, and competitors Collaborate and coordinate in setting the goals and priorities in order to ensure effective response to market conditions and technological opportunities Are all involved in major strategic decisions	Im and Workman (2004), Atuahene-Gima (2005), Menguc and Auh (2008)
Innovation capability	0.842	**In our innovation function, we systematically (1=Strongly disagree; 5=Strongly agree)** Invest in incrementally improved equipment, tools and techniques to improve the performance of our product development processes Acquire state-of-the-art product development knowledge, skills, equipment, tools and techniques Acquire new managerial and organizational skills that are important for our product development processes Use clear project targets, project phase standards and project management regulations for our new product development activities Support and encourage creativity, inventiveness and participation in product innovation and improvement Invite and use feedback and ideas from external partners (customers, suppliers, research institutes) to improve our product development practices and performance Adapt to changes in the competitive environment by innovating and improving our products Use mechanisms such as kaizen, improvement teams and incentives to systematically and continuously improve our performance	Guan and Ma (2003), Yam et al. (2004), Atuahene-Gima (2005), Vázquez-Bustelo et al. (2007), Akman and Yikmaz (2008), Zhou and Wu (2010), Kim et al. (2012), IMSS (2013)
Operational capability	0.876	**In our production function, we systematically (1=Strongly disagree; 5=Strongly agree)** Strengthen and upgrade current knowledge and skills for familiar products and technologies Invest in incrementally improved equipment, tools and techniques to improve the performance of our production processes Acquire state-of-the-art knowledge, skills, equipment, tools and techniques Acquire new managerial and organizational skills that are important for production Use clear project targets, project phase standards and project managing regulations for our production innovation/improvement activities Support and encourage creativity, inventiveness and participation in process innovation and improvement Invite and use feedback and ideas from external partners (customers, suppliers, research institutes) to improve our	Guan and Ma (2003), Yam et al. (2004), Atuahene-Gima (2005), Vázquez-Bustelo et al. (2007), Akam and Yikmaz (2008), Zhou and Wu (2010), Kim et al. (2012)

		production practices and performance Adapt to environmental changes easily and quickly by innovating and improving our processes	
Size		**Indicate the size of your business unit (number of employees)**	Devaraj et al. (2001), Im and Workman (2004)
Competition	0.726	**Indicate the extent to which you agree with the following statements (1=Strongly disagree; 5=Strongly agree)** Competition in our industry is cut-throat There are many "promotion wars" in our industry Anything that one competitor can offer, others can match readily Price competition is a hallmark of our industry One hears of a new competitive move almost every day	Jaworski and Kohli (1993), Auh and Menguc (2006), Jansen et al. (2006), Menguc and Auh (2008)
Dynamism	0.810	**Indicate the extent to which you agree with the following statements (1=Strongly disagree; 5=Strongly agree)** The technology in our industry is changing rapidly and unpredictably Technological changes provide big opportunities in our industry A large number of new product/service ideas have been made possible through technological breakthrough in our industry In our main market, customer product/service preferences change significantly over time We are witnessing demand for our products/services from customers who never bought them before In our main market, customers regularly ask for new products, and services	Jaworski and Kohli (1993), Im and Workman, (2004), Jansen et al. (2006, 2009b), Atuahene-Gima (2005), Zhou and Wu (2010)

Table 2. Descriptive statistics

	Mean	Standard deviation	No.	Business performance	Operational performance	Innovation Performance	Strategic Capability	Innovation Capability	Operational Capability	Size	Competition
Business performance	3.431	0.874	147	1							
Operational performance	3.881	0.568	146	0.313**	1						
Innovation performance	3.482	0.747	159	0.416***	0.445***	1					
Strategic capability	3.923	0.539	189	0.199*	0.250***	0.200*	1				
Innovation capability	3.546	0.745	183	0.157†	0.182*	0.433***	0.312***	1			
Operational capability	3.709	0.706	180	0.235*	0.401***	0.287***	0.367***	0.3463***	1		
Size	2.376	2.376	189	0.124	0.022	0.130	0.056	0.2662	0.1054	1	
Competition	3.330	3.331	186	0.006	0.049	0.077	0.095	0.0669	0.0037	0.128	1
Dynamism	3.171	0.621	188	0.153†	0.158	0.281***	0.219***	0.3214***	0.3056***	0.0041	0.3332***

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3. Regression coefficients

	(1) Business Performance	(2) Business Performance	(3) Business Performance	(4) Business Performance	(5) Operational Performance	(6) Innovation Performance	(7) Business Performance	(8) Business Performance	(9) Business Performance
Operational performance							0.5274***	0.6038***	
							(0.1241)	(0.1413)	
Innovation performance							0.2601*		0.4048***
							(0.1089)		(0.1090)
Strategic capability	0.2848*			0.1792	0.1843†	0.2320*		-0.0199	0.2251†
	(0.1373)			(0.1380)	(0.0988)	(0.1134)		(0.1260)	(0.1357)
Operational capability		0.3178*		0.2873*	0.3057***			0.0603	
		(0.1255)		(0.1338)	(0.0788)			(0.1364)	
Innovation capability			0.1269	-0.0222		0.2661**			-0.0750
			(0.1105)	(0.1155)		(0.0975)			(0.1082)
Size	0.1092	0.0676	0.0968	0.0744	-0.1051	-0.0284	0.1142	0.1677	0.0571
	(0.1323)	(0.1625)	(0.1390)	(0.1668)	(0.0820)	(0.0919)	(0.1324)	(0.1425)	(0.1350)
Competition	-0.0414	-0.0170	-0.0024	-0.0270	0.0372	-0.0736	-0.0021	-0.0492	0.0126
	(0.1096)	(0.1116)	(0.1081)	(0.1136)	(0.0630)	(0.0860)	(0.1039)	(0.1140)	(0.1021)
Dynamism	0.0950	0.0385	0.0716	0.0334	-0.0182	0.0949	0.0730	0.0937	0.0381
	(0.0586)	(0.0641)	(0.0639)	(0.0700)	(0.0369)	(0.0575)	(0.0566)	(0.0651)	(0.0644)
Cons	2.7741***	3.1548***	2.8137***	3.2295***	4.1951***	3.2845***	-0.2769	0.2574	1.6636*
	(0.5411)	(0.6237)	(0.5971)	(0.6673)	(0.3831)	(0.4091)	(0.7481)	(0.8545)	(0.7111)
N	146	140	144	138	144	158	117	125	134
adj. R^2	0.0369	0.0642	0.0145	0.0644	0.2238	0.2568	0.2296	0.1895	0.1121

Standard errors in parentheses. Hungary dummy variable included in the model specifications. † *p < 0.10,* * *p < 0.05,* ** *p < 0.01,* *** *p < 0.001*

turn, innovation performance has a positive effect on business performance (model 7). Model 9 shows that innovation capability has no significant effect on business performance, when the mediation effect of innovation performance on business performance is considered. Specifically, model 9 confirms the significant effect of innovation performance on business performance highlighted by model 7. Overall, these results support the hypothesis of a full mediation effect linking innovation capability to business performance, though innovation performance and business performance. Hence, H_3 is supported.

In H_4, we posit that the impact of strategic capabilities on business performance, is mediated by both operational and innovation performance. Models 5 and 6 show that strategic capability has a positive (albeit hardly significant, $p<0.10$) effect on operational performance and a positive and slightly more significant ($p<0.05$) effect on innovation performance. Model 8 shows lack of significance for strategic capability, when operational performance is considered in the model as an independent variable. Model 9 reports that strategic capabilities have a positive (but also hardly significant, $p<0.10$) effect on business performance, when innovation performance is included in the model. In sum, this evidence only partially supports H_4.

None of the control variables have significant effects in any of the nine models.

Table 4. Summary of the results

Hypotheses		Results
H_1	Strategic, innovation and operational capabilities affect business performance positively.	Partially supported
H_2	The impact of operational capability on business performance is mediated by operational performance.	Supported
H_3	The impact of innovation capability on business performance is mediated by innovation performance.	Supported
H_4	The impact of strategic capability on business performance is mediated by both operational and innovation performance.	Partially supported

5. DISCUSSION

One view on continuous innovation is that it represents a firm's capability to combine and balance exploration and exploitation. However, innovation theory has shed limited light on the capabilities needed to support and manage the combination of these two conflicting ambitions. Boer and Hyland (2006) argue for the importance of the role that strategic capability can have along operational and innovation capability on the achievement of superior business performance. Furthermore, they argue that being strong in each of these capabilities is not enough; they need to be aligned, coordinated and perhaps even be integrated. Finally, the authors hypothesize that the effective "design" and "functioning" of the continuous innovation stool is context dependent.

This paper aims to make a first step towards testing stool model, focusing on the hypothesis that stronger operations, innovation and strategic capabilities are associated with superior performance. The findings suggest that the three capabilities are highly and positively correlated. However, their individual and joint effects on business performance are limited – see Table 4.

This result goes against much previous research on the business performance effects of ambidexterity – see O'Reilly and Tushman (2013) for an overview, and opens some important venues for further research. Most importantly, the analyses need to be refined and extended. Several lines of reasoning may be followed to understand this finding.

- *Construct complexity* – The constructs employed in the present paper are rather "massive" – altogether, the continuous innovation capability construct measures a total of 63 items representing 16 factors underlying three capabilities; the performance construct is measured using five items. Some of the capability items and factors may have a stronger performance effect than others. Most effects will be positive, but some may be negative, insignificant or U-shaped, and different items and factors may have different effects on the different performance items. Some factors may strengthen or weaken each other, while others may not interact at all. Further research should disentangle the constructs and look deeper into the individual factors, their interactions and performance effects. This requires an analysis using structure equation modeling.
- *External factors affect business performance* – Business performance is not only affected by a firm's capabilities. Competitive intensity may pay a role – firms in, for example, the automotive and electronics sectors have to be excellent just in order to survive. Economic context could be another factor affecting a firm's performance positively (e.g. enhancing growth) or negatively (e.g. reducing sales). An analysis using external data such as the Global Competitiveness Index (GCI) (e.g. Schwab, 2017) and its underlying indicators could shed light on this suggestion.
- *Maturity of capabilities* – We focused on business performance relative to competitors, and measured the as-is situation of the 63 items, most of which represent operations, innovation and strategic management practices. However, we cannot know when these practices were actually implemented and how mature they actually are. As Sousa and Voss (2008, p. 706) observe, "*the generally accepted view [is] that there are time lags between the implementation of practices and their performance effects*"; therefore, "*future studies, especially if employing smaller samples, should control for practice maturity*" by "*estimating the typical length of time for different sets of practices to achieve maturity in an organization or by developing actual measures (or indicators) of maturity*". Alternatively, a longitudinal research design could be used.
- *Context affects the strength of a firm's capabilities and, through that, its performance* – We controlled for size, market and technological dynamism, and competition intensity. However, various other organizational and environmental characteristics should be expected to affect the adoption, interaction and performance effects of the three capabilities. Obvious candidates are:
  - Firm level characteristics:
    - Strategy – Miles and Snow's (1978) strategy typology distinguishes between reactors, defenders, analyzers and prospectors. Put briefly, reactors do not have a strategy and do not excel in operations nor innovation. Defenders focus on operations, prospectors on innovation, analyzers on both in a, usually, ambidextrous form of organization. This implies that the importance of operations, innovation and even strategic capability depends on firm strategy. Other authors have theorized about or studied the importance of strategic intent for exploitation and exploration (e.g. O'Reilly and Tushman, 2008).
    - Organizational structure – previous research has indicated the influence of centralization, formalization, connectedness (e.g. Jansen et al., 2009a, 2009b; Chang and Hughes, 2012; Raisch and Birkinshaw, 2008).
    - Organizational culture – following Cameron and Quinn's (2006) competing values framework, firms have rather different strategic orientations, core values, leadership styles and performance priorities supporting the control-flexibility and internal-external dimensions underpinning the developmental,

group, rational and hierarchical cultures distinguished in their framework. An externally-flexibility oriented developmental culture, for example, should affect continuous innovation differently than its opposite, an internally-control oriented hierarchical culture.

- Product and process characteristics: firms vary widely in terms of aspects such as the modularity of their products, production process type (job shop, batch, mass, continuous process), customer order decoupling point, position in the supply chain, and vertical integration, all of which have influence on their operations, innovation and strategic practices and, in effect, capabilities.
- Top management – including characteristics such as behavioral integration, consensus and leadership (e.g. Lubatkin et al., 2006; O'Reilly and Tushman, 2008; Chang and Hughes, 2012).

- Environmental characteristics: in addition to dynamics and competition intensity, factors such as environmental complexity and hostility (or munificence) could be considered (e.g. Menguc and Auh, 2006; Raisch and Birkinshaw, 2008; Lavie et al., 2010; also see O'Reilly and Tushman, 2013).

6. CONCLUSIONS

This paper is a first attempt to test the continuous innovation stool model (Hyland and Boer, 2006) using data obtained through the multi-respondent Continuous Innovation Survey. Our contribution is twofold. First, we operationalized the three capabilities that represent continuous innovation capabilities in a rigorous way. Second, we assessed their effect on performance, testing the competitive effect associated with each capability and showing a comparable effect due to these capabilities on business performance. The main finding is that both the individual and the combined effects of the three capabilities is limited. A variety of factors ranging from the role of strategy to that of organizational and environmental characteristics, each requiring further research, may explain this finding.
Further research is also needed to investigate the role of alignment, coordination and integration. In most firms, exploitation and exploration are spatially separated (Volberda, 1998; Markides, 2013). That is, strategy is the domain of top management, innovation that of the product development department, and production is responsible for operations. Further research should look into the performance effects of alignment, coordination and perhaps even integration (Boer *et al.*, 2006; Markides, 2013) of the functions "carrying" and the practices underpinning the three capabilities.
Fortunately, the Continuous Innovation Survey database contains most of the firm-level data needed to pursue these venues. External data such as the Global Competitiveness Index (GCI) (e.g. Schwab, 2017) and its underlying indicators are available to test the impact of country-level factors.

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